

lower portion of the chamber beneath the wafer support member.

9. Semiconductor apparatus useful to control processing gas flowing onto a wafer held within the chamber, the apparatus comprising:

a chamber having an upper portion and a lower portion;

a platform for holding a wafer for the processing thereof within the chamber;

a gas pipe for flowing processing gas down through an exit-end thereof into the upper portion of the chamber; and

an impeller which comprises a plurality of fan-like blades radiating from a center to an outer rim, the blades being circumferentially spaced and overlapping each other with a front edge of one blade being beneath and ahead of a rear edge of the next blade and so on, there being respective spaces between the blades where they overlap, the spaces between the blades forming secondary gas passageways for directing respective streams of gas laterally beneath the impeller into a rotational swirling motion, the impeller being fixed within the gas pipe above its exit-end, such that when the swirling gas beneath the impeller flows into the upper portion of the chamber internal forces cause the gas to flow outward across the chamber and then down evenly onto and over a wafer on the platform.

10. The apparatus of claim 9 wherein the blades of the impeller are generally flat and are tilted sufficiently to provide the spaces between the overlapping portions of the blades, inner ends of the blades being joined at a center, outer rims of the blades being fixed within the gas pipe such that the impeller is athwart the gas flow at right angles thereto.

11. The apparatus of claim 9 wherein there is a vertical center axis with which the gas pipe, the chamber, and the platform are aligned along with the center of the impeller.

12. The apparatus of claim 9 further comprising an exhaust pipe adjacent the lower portion of the chamber for removing used processing gas.

5 13. A method of evenly spreading processing gas onto and over the surface of a semiconductor wafer, the method comprising the steps of:

flowing a stream of processing gas in a pipe downward toward a wafer being held in a chamber;

10 generating a whirlpool-like laterally swirling motion in the gas stream; and

using internal forces within the swirling gas to cause it on entering the chamber to flow immediately outward within the chamber and then down evenly onto and over a wafer within the chamber.

15 14. The method of claim 13 wherein the gas is caused to swirl by passing the gas flowing downward in the pipe through a fixed impeller which directs the gas flow into a plurality of secondary gas streams which flow laterally and rotationally within the pipe.